



CLAIMS:

1 A centralizer apparatus comprising
2 a tubular body with an exterior surface,
3 a first collar movably emplaced around the tubular
4 body and movable longitudinally thereon,

5 a plurality of spring bows, each spring bow having
6 a first end spaced apart from a second end, each spring bow
7 biased outwardly from the tubular body, the first ends
8 connected to the tubular body, the second ends connected to
9 the first collar, so that upon movement of the first collar
10 the spring bows move toward the tubular body.

1 2. The centralizer apparatus of claim 1 further comprising
3 a first groove in the exterior surface of the
4 tubular body, the groove defined by a top side wall and a
5 bottom side wall,

6 the first collar movably disposed in the groove, and
7 the first groove side walls limiting first collar
movement.

1 3. The centralizer apparatus of claim 1 further comprising
2 a second collar movably emplaced around the tubular
3 body and movable longitudinally thereon, and

4 the first ends of the spring bows connected to the
5 second collar, so that upon movement of the second collar the
6 spring bows move toward the tubular body

1 4. The centralizer apparatus of claim 3 further comprising
2 a second groove in the exterior surface of the
3 tubular body, the second groove defined by a top side wall and
4 a bottom side wall,

5 the second collar movably disposed in the groove,
6 and

7 the second groove side walls limiting second collar
8 movement.

1 5. The centralizer apparatus of claim 2 further comprising
2 a spring bow recess in the exterior surface of the

3 tubular body beneath each spring bow for receiving a portion
4 of each spring bow.

1 6. The centralizer apparatus of claim 5 wherein the exterior
2 surface of the tubular body has a top level and the centralizer
3 apparatus further comprising

4 the first collar at or below the top level of the
5 exterior surface of the tubular body, and

6 a major portion of the spring bows receivable in the
7 spring recesses and disposable therein at or below the top
8 level of the exterior surface of the tubular body.

1 7. The centralizer apparatus of claim 4 further comprising
2 a spring bow recess in the exterior surface of the
3 tubular body beneath each spring bow for receiving a portion
4 of each spring bow.

1 8. The centralizer apparatus of claim 7 wherein the exterior
2 surface of the tubular body has a top level and the centralizer
3 apparatus further comprising

4 the second collar at or below the top level of the
5 exterior surface of the tubular body, and

6 a major portion of the spring bows receivable in the
7 spring recesses and disposable therein at or below the top
8 level of the exterior surface of the tubular body.

1 9. The centralizer apparatus of claim 1 further comprising
2 a stop member on the tubular body for abutting a top
3 of the first collar,

4 the first collar disposed at a bottom end of the
5 spring bows so that upon abutment of the top of the first
6 collar against the stop member the spring bows are pulled into
7 another member into which the centralizer apparatus is
8 inserted.

1 10. The centralizer apparatus of claim 1 further comprising
2 the tubular body is hollow with a bore extending
3 longitudinally therethrough.

1 11. The centralizer apparatus of claim 1 wherein the second

2 ends of the spring bows are secured to a second collar which is
3 immovably secured to the tubular body.

1 12. The centralizer apparatus of claim 1 further comprising
2 the first collar is releasably secured to the
3 tubular body.

1 13. The centralizer apparatus of claim 3 further comprising
2 the second collar is releasably secured to the
3 tubular body.

1 14. The centralizer apparatus of claim 1 further comprising
2 the second ends of the spring bows immovably secured
3 to the tubular body.

1 15. A centralizer apparatus comprising
2 a tubular body with an exterior surface,
3 a first collar movably emplaced around the tubular
4 body and movable longitudinally thereon,
5 a plurality of spring bows, each spring bow having
6 a first end spaced apart from a second end, each spring bow
7 biased outwardly from the tubular body, the first ends
8 connected to the tubular body, the second ends connected to
9 the first collar, so that upon movement of the first collar
10 the spring bows move toward the tubular body,

11 a first groove in the exterior surface of the
12 tubular body, the groove defined by a top side wall and a
13 bottom side wall,

14 the first collar movably disposed in the groove,
15 the first groove side walls limiting first collar
16 movement,

17 a second collar movably emplaced around the tubular
18 body and movable longitudinally thereon,

19 the first ends of the spring bows connected to the
20 second collar, so that upon movement of the second collar the
21 spring bows move toward the tubular body,

22 a second groove in the exterior surface of the
23 tubular body, the second groove defined by a top side wall and

24 a bottom side wall,
25 the second collar movably disposed in the groove,
26 the second groove side walls limiting second collar
27 movement,

28 a spring bow recess in the exterior surface of the
29 tubular body beneath each spring bow for receiving a portion
30 of each spring bow,

31 the surface of the tubular body having a top level
32 and the first collar and the second collar at or below the top
33 level of the exterior surface of the tubular body, and

34 a major portion of the spring bows receivable in the
35 spring bow recesses and disposable therein at or below the top
36 level of the exterior surface of the tubular body.

1 16. A centralizer apparatus comprising

2 a tubular body with an exterior surface, and
3 a plurality of spring bows, each spring bow in an
4 initial position and having a first end spaced apart from a
5 second end, each spring bow biased outwardly from the tubular
6 body, the first ends secured to the tubular body, the second
7 ends movable with respect to the tubular body.

1 17. The centralizer apparatus of claim 16 further comprising

2 the spring bows movable toward the tubular body by
3 contact with another member, and

4 upon movement of the centralizer apparatus through
5 the another member and cessation of contact with the another
6 member and release of the spring bows, the spring bows
7 contract outwardly and move away from the tubular body back to
8 the initial position.

1 18. The centralizer apparatus of claim 17 further comprising

2 a spring bow recess in the exterior surface of the
3 tubular body beneath each spring bow for receiving a portion
4 of each spring bow.

1 19. The centralizer apparatus of claim 16 further comprising
2 retainer apparatus on the tubular body for holding

3 the spring bow ends and guiding their movement.

1 20. The centralizer apparatus of claim 16 wherein the first
2 ends of the spring bows are below the second ends of the spring
3 bows so that the spring bows are pullable into another member upon
4 downward movement of the centralizer apparatus into the another
5 member.